

**Achievement of Market-Friendly Initiatives and Results Program
(AMIR Program)**

Funded By U.S. Agency for International Development

**Technical Specification
e-Government Data Center and Operation Center**

Final Report

**Deliverable for ICTI Component, Task No. 431.4.9
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This report was prepared by EDS in collaboration with Chemonics International Inc., prime contractor to the U.S. Agency for International Development for the AMIR Program in Jordan.

Introduction

The Jordan e-Government initiative will place its e-Government Data Center and e-Government Operation Center and in the basement of the NIC (National Information Centre) building next to the existing NIC Communications Room.

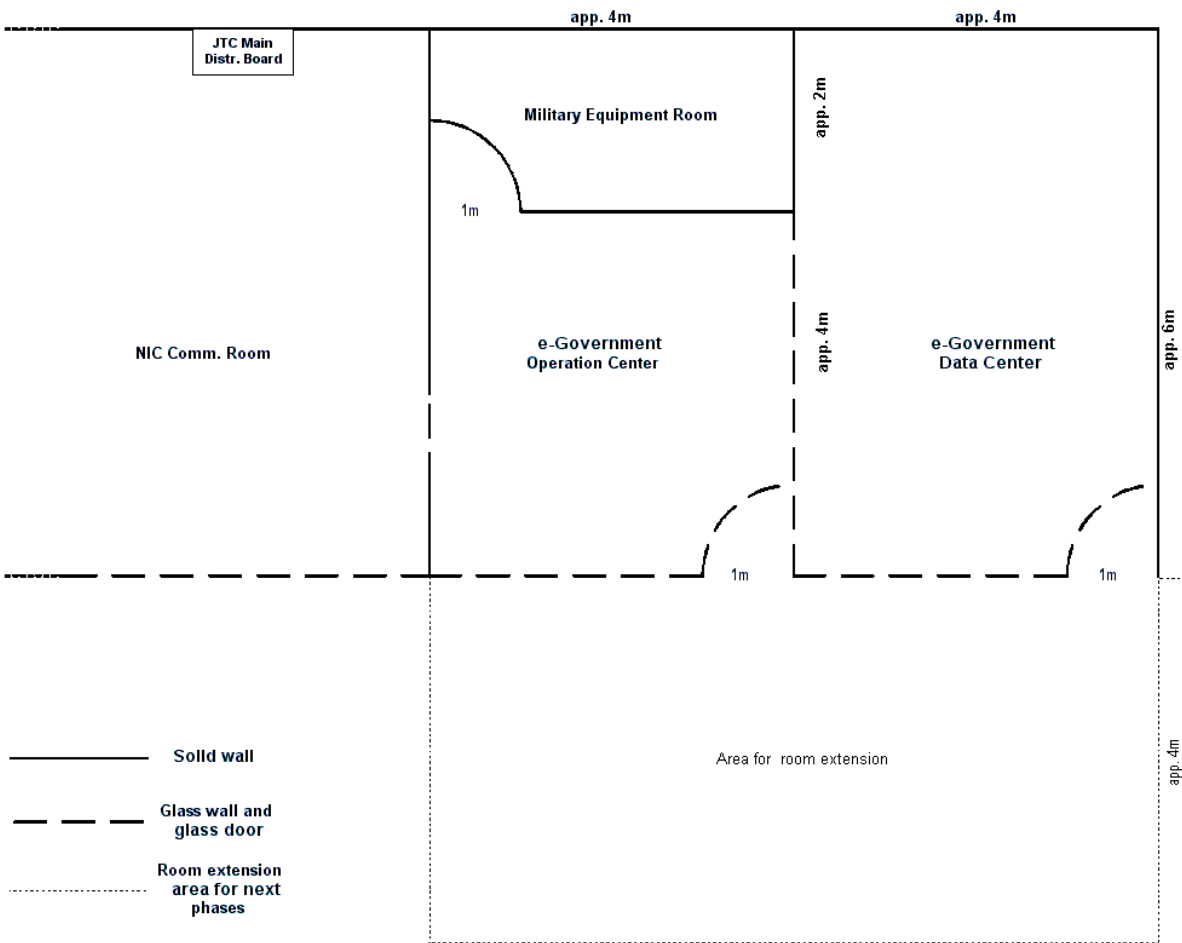
Please note the 1. Scratch of premises in this document.

General Instructions (mandatory)

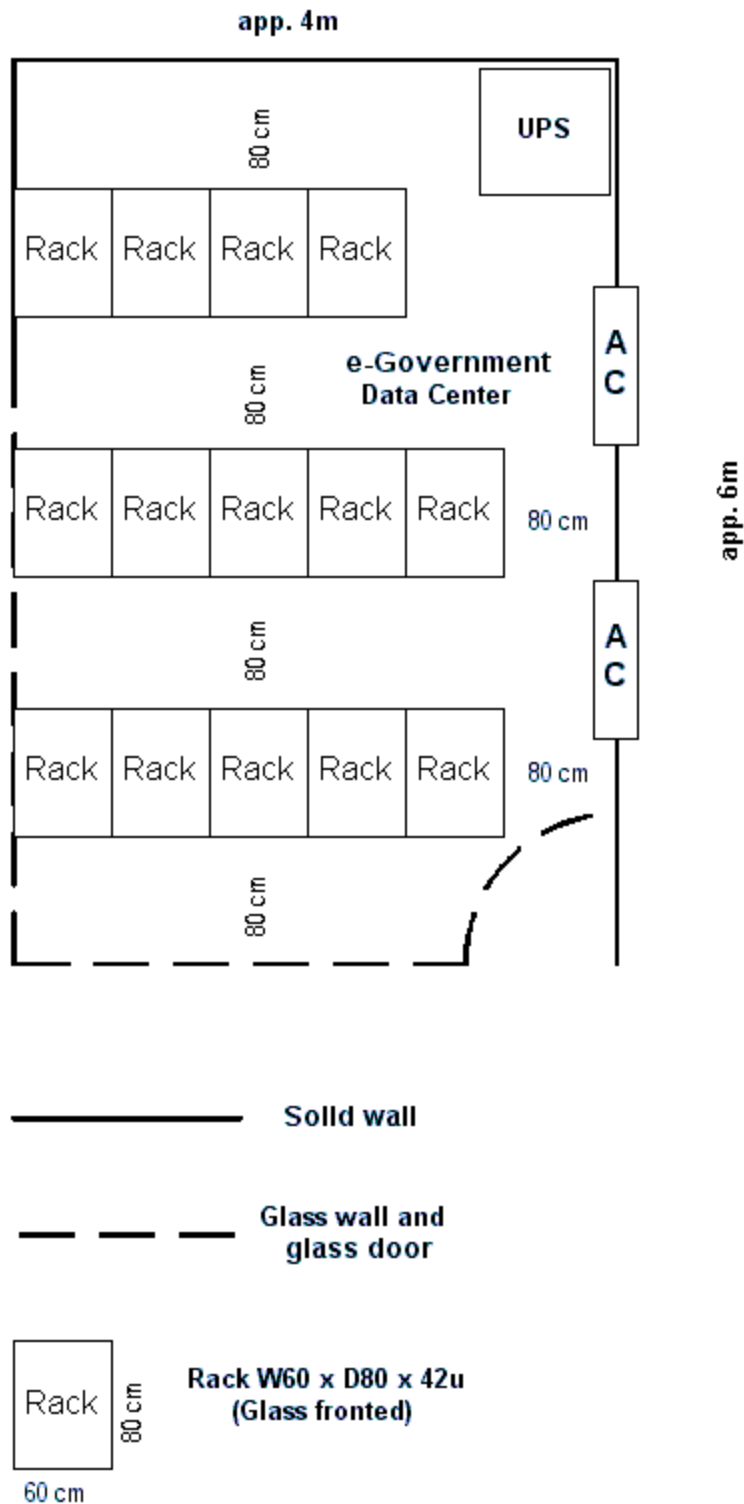
- In general international **standards, norms** and manufacturer recommendations have to be followed without any exception.
- The Data Center and Operating Center should always be in a **“Demo-Ready”** condition after implementation.
- Both rooms will be **glass fronted** and should be **fire protected** to meet the appropriate fire rating.
- All **water pipes and radiators** have to be removed in all rooms. There should be no water pipes in both rooms in future.
- In general all material including all cable and cable ducts has to be **flame-retardant and Halon free**.
- The ceiling has to be removed completely and to be replaced by a **flame resistant ceiling** in both rooms, including the Military Equipment Room.
- In general there has to be a proper **earthing** for all metallic material including all racks, rack doors, rack side walls, raised floor stands and cable ducts due to manufacturer recommendation and international standards and norms.

- All the cabling should be in **cable ducts** in general. For power and data cable should be separate ducts always.
- The **painting** of both rooms has to be flame-retardant.
- All **racking cabling** is under raised floor based in general.
- All **openings of the walls**, ceilings and floors in both rooms have to be closed with fire proofed material so that both rooms are totally protected against fire, smoke and water outside the rooms.
- All equipment in both rooms (i.e. desks) has to be **fire protected** (no wooden desks, no packages, no storage). There has to be no flammable equipment stored in both rooms.
- **Building earth bar or equipontential bonding bar** has to be approved and adjusted, if necessary
- In general the supplier has to take all **measurements** of rooms in the planning period before detail planning and implementation. All measurements given in this document are approximately only.
- The Operation Center has to be equipped with two **telephones** and one telefax. The Data Center has to be equipped with two telephones. All lines must have international access.
- There has to be a proper **labelling and documentation** in English and Arabic provided by the supplier to complete acceptance test.
- It should always be taken into consideration, that both rooms and equipment should be **extendable**.
- It should always be taken into consideration, that as an option in a **second phase** a generator, a professional power distribution unit, an automatically fire extinguishing system, additional cameras for monitoring, leak detection systems and a second building entrance for JTC cables will be installed.
- The position of racks and other equipment has to be planned in a detailed planning. The following 2. Scratch of Premises is a sample.
- This technical specification may not be complete and suppliers are welcome to give additional advice.

1. Scratch of Premises



2. Scratch of Premises



Card Readers

- Three (3) card readers (a + b + c) should be installed in front of the Operating Center (a), in front of the Military Equipment Room (b) and in front of the Data Center (c).
- The power of all card readers should be connected to the UPS.
- There should be three different entrance levels:
 - Level 1: entrance door a only
 - Level 2: entrance door a + b
 - Level 3: entrance door a + c

Doors

- Three doors including frames have to be installed:
 - Operating Center room door (glass fronted)
 - Data Center door (glass fronted)
 - Military Equipment Room door (will replace existing door, new door to be open inside Military Equipment Room – see scratch)
- All doors should be fire protected and have a width of 1 meter.
- All bulky equipment > 1m has to be delivered in the rooms before installing the doors (i.e. UPS, AC's)

Camera Monitoring

- A camera has to be installed to monitor the entrance of the Data Center.
- Two monitors have to be provided in the Minister's office in the Ministry of Information and Communications Technology (MoICT) at 8th circle and the Support Center (in MoICT or at NIC, to be decided).
- A data line (ISDN) has to be provided between the Data Center in the NIC and the Minister's office in the Ministry of Information and Communications Technology (MoICT) (and the Support Center, if necessary) for online monitoring the entrance of the Data Center.
- Additionally there should be a tape recorder for permanent recording the Data Center entrance.

Data Save

- There should be a high class fire proofed cabinet for data tapes. Tapes and disks should always be kept in this cabinet (app. 2qm).

Data Center Racking

- There should be a sufficient number (*to be planned*) of IT Infrastructure racks. These IT and Communications racks will be 19“framed white APC* racks and sized at W600mm x D800mm x 42u high and have full cable management facilities inside. They will be of showcase standard with glass-fronted doors. The racks within the Data Center will support all LAN and WAN components as well as Servers, Storage and Panels.
- All racks have to be supplied with fans and double power distribution sockets on both sides from the back.
- The power distribution sockets of the racks have to be connected to a Power Distribution Unit in the raised floor.
- All racking cabling is under raised floor based in general.
- Earthing of rack frames, rack doors, rack side walls and plug-in units due to manufacturer recommendation and international standards.

*Alternative: Rittal

Raised Floor

- Both rooms have to be equipped with raised floor excluding door opening space.
- The top of raised floor to ceiling height should be a minimum of 42u rack high + 10cm.
- Raised flooring in both rooms should be a factory bonded 600mm x 600mm PVC tile with the ESD surface 10 to the 6 (i.e. manufacturer MERO).
- There should be a minimum void under the floor of 250mm.
- Raised floors should be fire proofed and electrically continuous throughout, where constructed of electrically conductive material and should be bonded to earth due to manufacturer recommendation. Each bond shall be made to the floor pedestal utilizing proprietary cable clamps. Bonded pedestals must be connected direct to the building earth bar or equipotential bonding bar utilizing a minimum of 10 mm² CSA LSF copper bonding conductor with appropriate colour coding insulation.
- Three lifting and one cutting tools for raised floor boards.

Electrical Services

- Electrical services within both rooms must be capable of providing a safe sustainable power source in order to maintain the operation of the equipment. The scope of the electrical engineering work associated with the both rooms is as detailed below. The list is indicative of the work to be carried out but is not to be considered exclusive.
 - Provide power for regular and UPS distribution for all equipment.
 - Power distribution for racks in general is via a power distribution unit, raised floor based
 - Provide power for Air Conditioning equipment to support both rooms.
 - Provision of connectivity to the UPS.
 - Provision of under floor power connectivity for the Data Center equipment from UPS.
 - Lighting (standard power) and emergency lighting (UPS based).
 - Basic fire alarm system on the ceiling.
 - Wall sockets (4 on each solid wall in each room, regular power), all separate fused, for measuring instruments.

Power Installation

- The power supplies to the distribution board and associated air conditioning plant shall be derived from a spare circuit protective device on the existing main building switchboard.
- An independent power distribution board is to be provided to support both rooms. The power distribution board should be installed at a suitable location within the Data Center.
- From this power distribution box a connection at 220v to the UPS system is to be made.
- 220v power connections will be supplied to each rack separate for both regular and UPS power. These circuits should be fused at 20amp on a 32amp ring.
- The overall power requirement for both rooms is 60 KVA.

Air Conditioning Systems

- There are a number of factors that constitute an overall heat gain within both rooms. In summary these gains could be: Heat gains from equipment, from occupants, geographical location, Solar gains from glazing, walls and internal heat gains from adjacent rooms.
- Maintaining both rooms at a steady temperature and humidity will require 2 (Data Center, 2 tons) and 1 (Operation Center, 2 tons) air conditioning units. These will be ceiling mounted and shall maintain the temperature and humidity to within the design parameters. The air conditioning units shall be linked, via refrigerant pipe work; to 1 each room or more externally mounted air-cooled condensers in order to reject heat.
- Temperature shall be controlled to maintain a steady state to prevent thermal shock to sensitive IT/communication components. Similarly the humidity shall be controlled to prevent static build-up and the formation of condensation in sensitive IT/communication components.
- The air conditioning units shall incorporate an electric heater battery, which will enable the unit to provide heat should it so be required.
- The air conditioning units shall be controlled by a wall-mounted controller giving the user control of both the temperature and humidity.
- The air-conditioning for this room should be delivered from under the raised floor direct to the racks and working units.
- The system needs to support the room at a temperature of: 22°C +/- 1.0°
- The system needs to support the room at a humidity level of: 45% +/- 3% RH

UPS

- A battery backed UPS system will be provided to protect the Data Center and Operation Center equipment.
- The UPS shall be sized 60 KVA.
- The UPS selected shall operate initially at its rated load with batteries sized to provide minimum 30 minutes back-up time at that rated load.
- A manual maintenance by-pass switch should also be provided.
- Where supplied via the UPS unit the distribution board can be isolated via an emergency knock off stop button.
- The UPS power cable needs to be from the main source of building directly (main source -> main circuit breaker -> UPS -> secondary circuit breaker for each under raised floor distribution unit -> each rack).
- The UPS has to have Network Management Software
- For a later option the UPS has to be prepared to install behind a power generator.

Fire Alarm Systems and Fire Extinguishing Systems

- Fire alarm systems in both rooms must be provided to enable automatic fire detection and warning.
- Manual fire extinguishing systems good for IT/Communication environment due to international standards and norms for both rooms.

Cable Routes

- The PTT incoming service duct provided should be of a suitable standard and size. There should be a number of access tubes into the building ideally 200mm in diameter. From the JTC main distribution board (in the existing NIC Communications Room) there should be a cable route into the new Data Center.
- A secondary JTC distribution board (with panels for 300 pair cable) has to be provided in the Data Center.
- A 300 pair cable has to be laid between the JTC main distribution board in the NIC Communications Room and the secondary distribution board in the Data Center
- There should be fire protected cable routes to service all racks of the Data Center. These routes should be of the cable basket type and should be 400mm wide and 100mm deep for the main runs and 200mm x 100mm for the arms off of the main runs.
- Power and data cables should be in separate ducts.
- All cable routes to outside the room have to be closed with fire protection material.

Internal Local Area Network (LAN) Cabling Standards

- All cabling should be Category 5E, Unshielded Twisted Pair (UTP) as the standard cable infrastructure.
- Any reference to Cable in this document should be taken as meaning the above cable standard.
- All cable terminations for the above systems will be either:
 - Standard “RJ45” Female termination
 - *Standard “RJ45” Male termination*
- Major suppliers have a standardized on 4 ports per user station. These ports will be Standard RJ45 female terminations. There should be 20 outlets terminated at the Communication Rack under the raised floor in the Operation Room.
- The 4 port user end terminations will follow standard colour codes. The RJ45 Female connector blocks will be from left to right, Green, Yellow, Blue and Red. The Green will be used for Telephone Connectivity, Yellow and Blue for active data and the Red will be spare for anything (Fax, Printers etc.).